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ABSTRACT

Developed by the Initial Learning in Mainstreaming Project, the manual presents an instructional program to teach mainstreamed handicapped elementary school students how to do long division to remainders. In addition to detailed teaching instructions and text of tape recordings for students, the manual includes tests, worksheets, and pages to be made into transparencies for projection. (DLS)

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LONG DIVISION TO REMAINDER

BY FERN S. TIPTON AND NELDON KINGSTON

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Title III 306 E.S.E.A.
Initial Learning in
Mainstreaming Project
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LONG DIVISION PROCESS TO REMAINDER

Table of Contents

Pages to be recorded.....p 1

Instructions for Using Fact Card.....p 2 & 3

Teacher General Instructions.....p 4

Child Needing Additional Help.....p 5

Part 1 - 1 Digit Divisor - 2 Digit Dividend.....p 6

Giving Help During Tape Presentation.....p 8

Giving Help for Problem B.....p 9

Recording Scores.....p 10

Giving Help to Students on Problems.....p 11

Part II - 1 Digit Divisor - 3 Digit Dividend.....p 13

Giving Help to Students.....p 17

Part III - 1 Digit Divisor w/3-4 Digit Dividend.....p 19

Instructions - Part IV - 0 In The Answer Row.....p 23

Part 2 - 0 In The Answer Row.....p 24

Part 5 - Long Division Process with Remainder.....p 25

Instructions for worksheets with A, B & C problems.....p 27

Record Forms.....

Transparencies.....

Entrance Test.....

Final Test.....

Worksheets.....

Keys to Correct Worksheets and Tests.....

Comment Sheets.....

Worksheets and Tests

Criterion Referenced Entrance Test
Worksheets - Page Numbers 1 through 28
Final Test

NOTE The following recording of scores should be considered a minimum. (See page 4 for easy reference)

To be recorded

Criterion Referenced Entrance Test
Page 1 - A & B problems
Page 2 - A & B problems
Page 5
Page 6 - A & B problems
Page 7 - A & B problems
Page 12
Page 13 - A & B problems
Page 14 - A & B problems
Page 19
Page 20 - A & B problems
Page 24
Page 25 - A & B problems
Page 26
Final Test

In long division problems like $8\overline{)58}$, where the number doesn't come out even (hence long division is involved) tell students to use the number closest to it <u>WITHOUT GOING OVER</u> to get their answer row number i.e.

Answer

x	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

READ ANSWER TO USE

Go across row

Till find number closest to it without going over.

It is important to recognize that the use of this table is a crutch to be used only for those students not having fact mastery necessary to learn the process trying to be taught. The use of the table should be withdrawn as rapidly as is feasible.

Problem: 7 x 9

x	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

Answer

Problem: $9\overline{)63}$

Answer

x	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

Go Across Row — READ ANSWER — Till find 63 or number closest to it.

TEACHER INSTRUCTIONS FOR FOLLOWING TAPES
AS THEY SHOW AND WRITE ON THE TRANSPARENCIES

(Teacher instructions are reinforced in parts of tape.)

(1) Point to numbers mentioned.

(2) When "bracket" is defined (not every time it is mentioned) outline it with pointer or finger.

(3) When tape says, "multiply back", trace or draw arrow back to show direction and which numbers are involved.

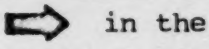
(4) When tape says, "draw a line and subtract", draw the line and put a subtraction sign (-) in front of the number to be subtracted.

(5) Circle the number being divided in Step 1: Divide.

(6) Please follow the tape as closely as possible, pointing out all numbers mentioned - circling where it suggests and anything else you think is appropriate in order to make instructions as clear as possible and easy to understand. This will provide visual aid as well as auditory.

VERY IMPORTANT

Whenever a child is having trouble understanding and you are helping him DO NOT use words like divisor, dividend, quotient, etc. Instead say the number outside of the bracket, the number inside of the bracket and the answer. In all your additional clarifying or explanations, it is important to do this also. It is our belief that the over use of technical terms is one reason students have trouble in math.

Each time you do something there is an  in the left hand margin. This is the only time are in the left hand margin.

If the teacher desires to take more scores than outlined, this is permissible. A blank record sheet is provided for this purpose. Often this can be done by asking those who did (or did not) get 80% (or other high percent) correct to raise their hands and noting those who have trouble.

Remedial loops are provided with this instructional material. They may be used anytime a student has passed the concept taught in the loop but still doesn't understand it. This should be done all the way through this instructional material even though it isn't formally stated in the manual.

LONG DIVISION PROCESS TO REMAINDER

Part I - 1 Digit Divisor - 2 Digit Dividend

Start Day 1

Sample Dialoque:

"Today we're going to learn about long division. This is one of the most important and most interesting processes in all mathematics. We're going to learn how to do this an easy way - a step at a time - just like walking down stair steps. When we walk down stair steps, we take one at a time - carefully! If we miss one we may take a tumble. If we watch what we're doing and follow the steps we'll be all right."

Present the 5 steps of long division.

Transparency #1

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down

Then start over

$2\overline{)74}$

Using the problem identify the parts of the problem such as: THE BRACKET, THE NUMBER OUTSIDE OF THE BRACKET (DIVISOR) AND THE NUMBER INSIDE THE BRACKET (DIVIDEND), THE ANSWER ROW and etc.

ALSO

Explain the meaning of each step. There is a transparency provided for each step. **Transparency #2 through #7.** Explain and show on the transparency how each step relates to the problem. COLOR THE TRANSPARENCY BEFORE SHOWING CLASS.

NOTE

On each transparency is provided an explanation of the step. There is a problem provided with aspects of the step in red to assist you in explaining to the class what is done during each step, DO NOT work the problem further on these transparencies than the step provided, as this problem is worked out later.

THEN

Go back to Transparency #1

Use tape presentation 1

Work the problem for the students using tape 1 and going through the 5 steps exactly as they are presented. (If you use a transparency, mark with wax crayons or an erasable water base pen.) Follow the tape as it shows how the 5 steps work by making gestures, circling motions, arrows to indicate direction, etc. to facilitate understanding.

5 steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down

Then start over

$$\begin{array}{r} 37 \\ 2\overline{)74} \\ -6 \\ \hline 14 \\ -14 \\ \hline 00 \end{array}$$

This problem was chosen to use first because it is basic long division. There are no irregularities. It is a typical 1 digit divisor, 2 digit dividend, no remainder type.

$$\begin{array}{r} 37 \\ 2\overline{)74} \\ -6 \\ \hline 14 \\ -14 \\ \hline 00 \end{array}$$

NOW

Place TRANSPARENCY #8 on the projector and USE TAPE PRESENTATION #2. Make sure to follow the tape script while showing the transparency by pointing, writing, circling and any other ways in order to indicate important aspects which will clarify the process and facilitate understanding. The transparencies and the script will reinforce controlling rules by which the problem can be solved.

Transparency #8 uses tape presentation #2
Transparency #9 uses tape presentation #3
Transparency #10 uses tape presentation #4

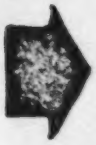
ASSIGN PAGE #1 and have class work only problem A as the tape has instructed them.

THEN

Go around the room helping students who are having problems. RELATE THE HELP YOU GIVE TO THE STEPS. CHECK WITH STUDENTS YOU SUSPECT MAY NEED HELP.

When the class is ready

Correct problem A using Tape Presentation #3 and Transparency #9.



Ask everyone in the class who got the problem right to raise their hand. MAKE MENTAL NOTES OF STUDENTS WHO DO NOT RAISE THEIR HANDS.

THEN

1. Ask for questions.

2. Assign problem B.

   While students are working on problem B

3. Check on students you noted did not get problem A right and help them.

When Problem B is corrected

1. RECORD GO TO THE I. R. RECORD SHEET AND record the students who have the problem right. FOLLOW THE DIRECTIONS ON THE TOP OF THE RECORD SHEET.

2. Ask for questions.

3. Assign the rest of the worksheet.

4. Assist students needing help. Relate this help to the steps.

END OF DAY 1

Day 2

Place transparency #11 on the projector and put accompanying tape, presentation 5, in recorder. Make appropriate gestures on transparency as the tape indicates.

This tape is to reinforce learning from the teacher presentation and to review the controlling rules governing accuracy in computation.

Tape presentation #5 uses transparencies	#11
	#12
	#13
	#14
	#15
Tape presentation #6 use Transparency	#16
Tape presentation #7 use transparency	#17

TEACHER ASSIGNS PROBLEM A PAGE #2 and walks around the room while children are working, paying close attention to those having trouble. As she offers help she should relate to the 5 steps such as "Do you remember the 5 steps? The 5 steps are:..... Follow them and you will be all right."

Place transparency #16 on the projector. Teacher writes on this transparency as she computes problem A as dictated by the tape presentation #6.

Teacher asks for any questions and provides explanations to questions, etc. She then instructs children to do problem B. When they have finished, she puts transparency #17 on the projector, turns tape presentation #7 on and proceeds as in problem A.

When giving help, relate the help to the rules.

Assign the rest of page #2 to the class. While the class works, check with those students having problems on problem A or B.

Use pages #3-#5 as necessary for the class. Each day they are used for an assignment, review one of the previous transparencies with the class before assigning the days work. Walk around the room while the class works helping the students who do not understand. Relate the help to the rule steps and explain why they are making errors i.e. times tables, or step 2, multiply back, etc.

Part II - 1 Digit Divisor - 3 Digit Dividend With divisor going into 1st two numbers of dividend.

Place Transparency #18 on projector

Sample Dialogue:

"Let's try another problem in long division. We will follow the same 5 important steps in order to do it correctly. Can anyone remember what those 5 steps are and tell them to me? Then I will write them down for all to see."

Review and re-write the 5 steps:

1.
2.
3.
4.
5.

THEN

Present the problem:

$3\overline{)135}$

Sample Dialogue:

"Oh-oh. This problem is a little different. We have 3 numbers inside the bracket and the first number inside the bracket is smaller than our divisor, 3.
The rule we learned before said:

RULE

> Divide the divisor, which is the number outside the bracket, into the first number inside the bracket if that number is as large or larger than the divisor.

"1 is the first number inside the bracket and it is <u>not</u> as large as our divisor so, what do we do? We simply take the next number also and divide our divisor, 3, into the first <u>2</u> numbers inside the bracket. Our number then is now 13. I will circle the 13 to show you."

NOW

Work the problem for the children the same as before, using appropriate gestures, circles, arrows, etc.

5 Steps

1.
2.
3.
4.
5.

$$\begin{array}{r} 45 \\ 3\overline{)135} \\ -12 \\ \hline 15 \\ -15 \\ \hline 00 \end{array}$$

REMEMBER

To reinforce the 5 steps as you go along by repeated reference to each as is appropriate in the computation.

- NOW -

Place transparency #19 on the projector and put tape presentation #8 in the recorder. Make sure to <u>follow the tape and make gestures</u> in appropriate places in order to clarify the process and facilitate understanding. The transparencies and the tape will reinforce controlling rules by which the problem can be solved.

Transparency #19 uses tape presentation #8
Transparency #20 uses tape presentation #9
Transparency #21 uses tape presentation #10

Assign problem A, Page #6. When the class is ready, correct it with transparency #20 and tape presentation #9. Help students needing it while the class works problem A.

Ask everyone in the class who got the problem right to raise their hand. MAKE MENTAL NOTES OF STUDENTS WHO DO NOT RAISE THEIR HANDS.

THEN

1. Ask for questions.

2. Assign problem B.

While students are working on problem B

3. Check on students you noted did not get problem A right and help them.

Use Transparency #21 and tape presentation #10 to correct Problem B.

Assign the rest of the worksheet as indicated on the tape.

Place transparency #22 on the projector and put tape presentation #11 in recorder. Make appropriate gestures on transparency as the tape indicates.

This tape is to reinforce learning from the teacher presentation and to review the controlling rules which govern accuracy in computation.

Transparencies #22 and #23 uses tape presentation #11
Transparency #24 uses tape presentation #12
Transparency #25 uses tape presentation #13

Teacher assigns problem A, Page 7 then walks around room helping students who are having problems. RELATE THE HELP YOU GIVE TO THE STEPS. CHECK WITH THE STUDENTS YOU SUSPECT MAY NEED HELP.

Place transparency #24 on projector. Teacher writes on this transparency as she computes problem A as dictated on recording #13.

Teacher asks for any questions and provides explanations to questions, etc.. She then instructs children to do problem B, page #7. While they work, give help to those needing it. When the class has finished, put transparency #25 on the projector, turn recorder on and proceed as as in problem A using tape presentation #13.

Assign the rest of page #7

Use pages #8-#12 for assignments as needed by the class. Use one of the previous transparencies to briefly review the division steps before each days assignment. Walk around the room checking with students who have problems as the class works.

LONG DIVISION PROCESS TO REMAINDER

Part 3 - 1 Digit Divisor with 3-4 Digit Dividend (Double Process)

Place transparency #26 on projector.

Sample Dialogue:

"Now that you all know the 5 important steps in doing long division, we will do a longer problem - one that will make us repeat the steps almost 3 times. Shall we review the 5 steps? Who can name them for me and in the exact order?"

Write down the 5 steps.

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

THEN

Present the Problem: $4\overline{)796}$

Sample Dialogue:

"We will divide 4 into 796. 4 is our divisor because it is the number outside the bracket. We will divide this 4 into the first number inside the bracket, which is 7, because that number is as large or larger than our divisor 4, etc."

Work the problem through with the students. Be sure to state each step as you go and explain how each directs the computation. Again, use appropriate gestures, circles, subtraction signs (-), arrows, etc. to facilitate understanding.

1.	Divide	199 / 4)796
2.	Multiply	-4
3.	Subtract	39
4.	Compare	-36
5.	Bring Down	36
	Start Over	-36
		00

REMEMBER

It is of utmost importance for the students to use the 5 steps exactly as listed - and to see how easy it is to arrive at the correct solution if this process is followed.

- NOW -

Place transparency #27 on the projector and put the tape presentation #14 in the recorder. Make sure to follow the tape while showing the transparency by pointing, writing, circling, etc. - in order to indicate important aspects which will clarify the process and facilitate understanding. The transparencies and the script will reinforce controlling rules by which the problem can be solved.

Assign problems A and B page 13, correcting as directed on the tape.

Transparency #27 uses tape presentation #14
Transparency #28 uses tape presentation #15
Transparency #29 uses tape presentation #16

Transparency #28 corrects Problem A, page #13.
Transparency #29 corrects Problem B, page #13.
These should be assigned and corrected as with previous worksheets with problems A and B on them. When A and B have been assigned and corrected, assign the rest of page #13. Help students needing help as on previous worksheets.

Place transparency #30 on the projector and put tape presentation #17 in recorder. Make appropriate gestures on the transparency as the tape indicates.
This tape is to reinforce learning from the teacher presentation, and to review the controlling rules governing accuracy in computation.

Transparency #30, #31 and #32 uses tape presentation #17
Transparency #33 uses tape presentation #18
Transparency #34 uses tape presentation #19
Transparency #35 uses tape presentation #20.

Assign and correct problems A, B and C, page #14, as indicated on the tapes. Follow the same procedure here as on previous worksheets which used a similar format. When problem C is corrected, assign the rest of the worksheet.

Use pages #15-#19 for additional work as needed by the class. Briefly review each day using a previous transparency before assigning the days work. Give help as needed as indicated previously.

Part #4

0 IN THE ANSWER ROW (QUOTIENT)

Part 1

Place the rule transparency, #36, on the projector. This will be used to remind students to put a zero in the answer row (quotient) when needed. Read the transparency to the class. Explain that this is important to remember and

Reread

it to the class.

PLACE

Transparency #37 on the projector and put tape presentation #21 into recorder.

Make sure you follow the tape with appropriate gestures, such as pointing, circling, showing position of numerals, etc., on the transparency to clarify concepts and facilitate understanding.

Part I	Transparency #37 uses tape presentation #21.
	Transparency #38 uses tape presentation #21.
	Transparency #39 uses tape presentation #21.
Part II	Transparency #40 uses tape presentation #22.
	Transparency #41 uses tape presentation #23.
	Transparency #42 uses tape presentation #24.

Teacher: After tape #21 you may want to ask for questions concerning this new concept of "0 in the Quotient." If children are not following with complete understanding, it may be well to "walk through" the last transparency, #39, and explain it further - or back up the tape and review it.

THEN - Go on to Part #2.

Part 2

See Part #2 table of transparencies and tape presentations on previous page. Assign A and B problems, page #20, and other problems, page #20, as stated on the tape and as done previously. Give help as needed by the class.

Use pages #21-#25 as needed by the class. Follow previous formats. Use previous "0 in the Quotient" transparencies to provide a brief review each day before assigning worksheets. REMEMBER, IT IS BETTER TO PROVIDE TOO MUCH PRACTICE THAN TO PROVIDE TOO LITTLE.

7. Record the score from page #26 on the worksheet record form. (✓ for those getting 4 or more right.)

8. Assign page #27 giving assistance to those students, indicated by the record, needing help.

Use pages #27 and #28 to provide practice in all the long division process taught this far.

After completing page #28, give the final test and record the results. The instruction below for students not doing well are applicable here.

IMPORTANT

Pages #30-33 are for review purposes. This should be used anytime the regular math curriculum goes more than about a week without providing practice in long division. After the concept is well set these reviews may be spaced at longer intervals. Scores should always be taken and recorded on reviews. Students not doing well should have their papers reviewed. If they did not do well because of the long division process they should do the appropriate remedial loop. If they do not do well for reasons other than the long division process (i.e. times tables) the teacher should make note of this and try to correct these other areas as far as is feasible.

Part #5

LONG DIVISION PROCESS WITH REMAINDER (R)

In this unit the pupil is not required to actually work the long division process but merely to recognize what to do with the remainder in order to deal with it as R. There are problems in the practice worksheet which requires the student to work the whole problem out and deal with R.

NOTE

In this unit there are no tape - transparency presentations. Follow the steps outlined below.

1. Present the rule transparency, #43, and go over it with the class.

2. Using transparency #44 go over how the rule applies to let the remainder be be dealt with as R.

3. Ask for questions and provide clarity as needed. (It may be necessary to reuse transparency #44 or make up problems to illustrate clarification.)

4. Assign problem A of page #26 and correct when the students are through, using transparency #45.

5. Assign problem B of page #26 and correct, using transparency #45, when the students are through working it.

6. Assign the rest of page #26.

Instruction

The worksheets with A and B or A, B and C problems are recorded by giving the students getting all of the problems right a ✓ under the total column. If in working with or reviewing the papers of students not receiving a ✓ you determine they know the process but are missing the problems because of facts or other prerequisite skills write OK for that student under the process column. Other worksheets that are recorded are treated in a similar manner except the % correct instead of a ✓ is used.

Long Division to Remainder

Student	Page 1 A & B	Page 2 A & B	Page 5 Division	Page 6 A & B	Page 7 A & B	Page 12	Page 13 A & B	Page 14 A & B	Page 19	Div. with 0 in the Quotient pg. 20 A & B	pg. 24 A & B	
Total / Process	✓	✓	%	✓	✓	%	✓	✓	%	✓	%	

Long Division to Remainder

Total / Process

Student	Page 1 A & B	Page 2 A & B	Page 5 Division	Page 6 A & B	Page 7 A & B	Page 12	Page 13 A & B	Page 14 A & B	Page 19	Div. with 0 in the Quotient: pg. 20 A & B	Div. with 0 in the Quotient: pg. 24 A & B
	✓	✓	%	✓	✓	%	✓	✓	%	✓	%

Long Division to Remainder

Student	Div. with Remainder		Others				Reviews						
	pg. 25 A & B	pg. 26											
	✓	%											

Long Division to Remainder	Div. with Remainder		Others				Reviews					
	pg. 25 A & B	pg. 26										
	✓	%										
Student												

Long Division
to Remainder

Student	Entrance Test	Final Total	Final Process	(3 no. answer) Multiple Process	0 in Quotient	R	Comments
	%	%	%	✓ if problem			

Long Division to Remainder

Student	Entrance Test	Final Total	Final Process	(3 no. answer) Multiple Process	0 in Quotient	R	Comments
	%	%	%	✓ if problem			

1

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

$2\overline{)74}$

2

Step 1 Divide

Divide the divisor, which is the number outside the bracket into the FIRST number of the dividend which is the number inside the bracket, IF THAT FIRST NUMBER IS AS LARGE OR LARGER THAN THE DIVISOR.

5 steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down

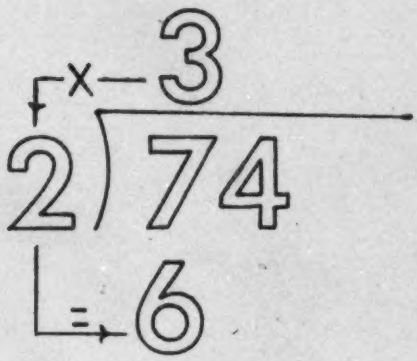
   Start Over

$$2\overline{)74}$$
$$3$$

3

Step 2 Multiply

Multiply back your answer from dividing times the number outside of the brackets. Put the answer under the number you are dividing.



5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

4

Step 3 Subtract

Subtract the number you got from multiplying from the number you divided into.

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

$$\begin{array}{r} 3 \\ 2\overline{)74} \\ -\,6 \\ \hline 1 \end{array}$$

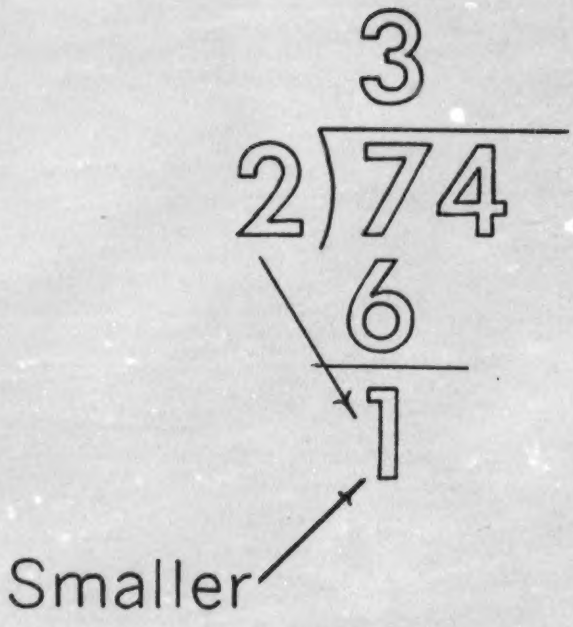
5

Step 4 Compare

Compare the answer from subtracting with the number outside of the brackets. It must be smaller or you have made a mistake.

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over



6

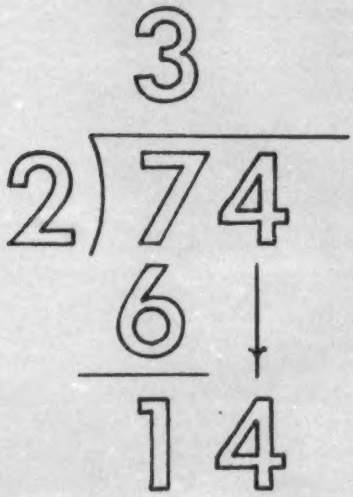
Step 5 Bring Down

Bring Down the next number in the brackets and put it next to the number you got from subtracting.

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down

   Start Over



Transparency

7

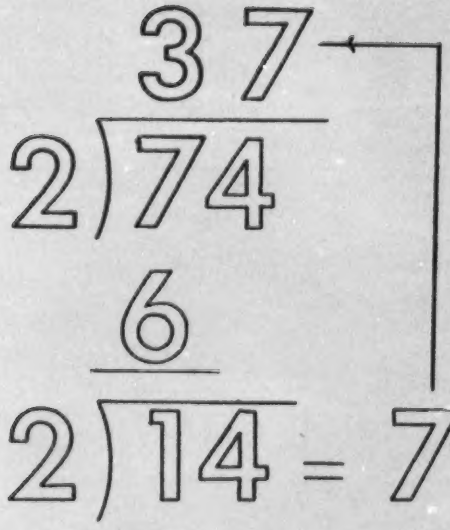
Start Over

Start over with the steps. Step 1 is Divide.

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down

   Start Over

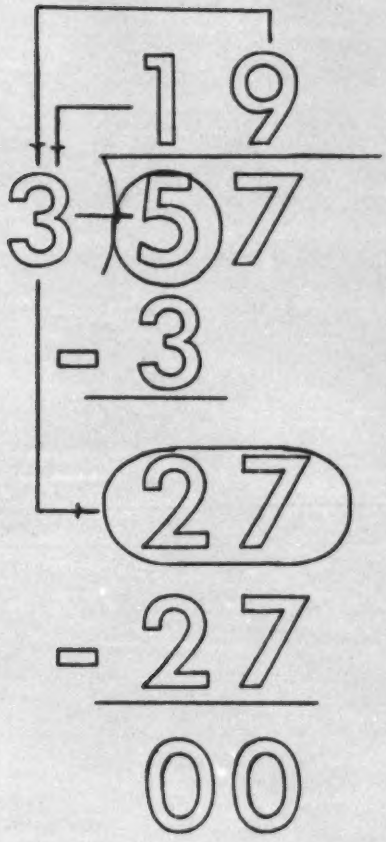


Next do step 2 - Multiply

8

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over



9

-A-

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

$2\overline{)54}$

10

-B-

5 Steps

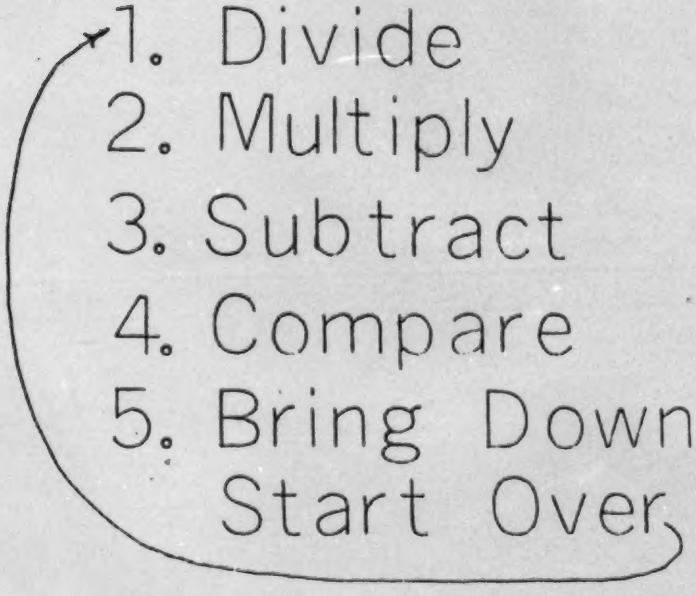
1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

$3\overline{)81}$

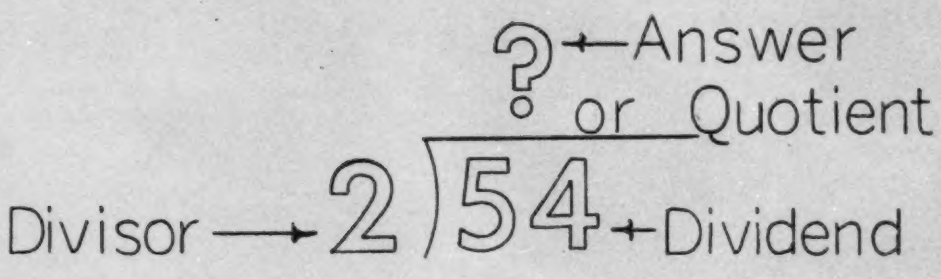
Transparency

11

5 Steps

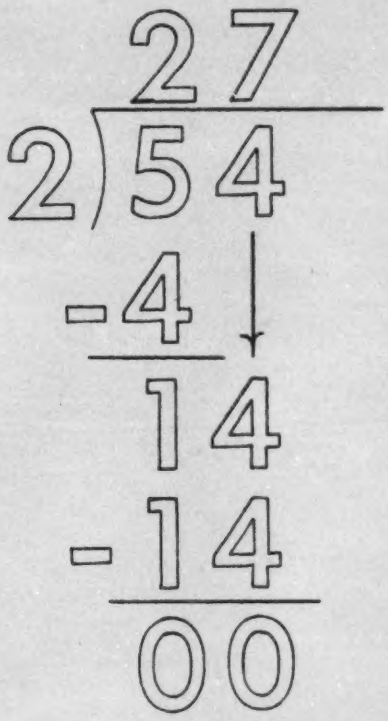


12

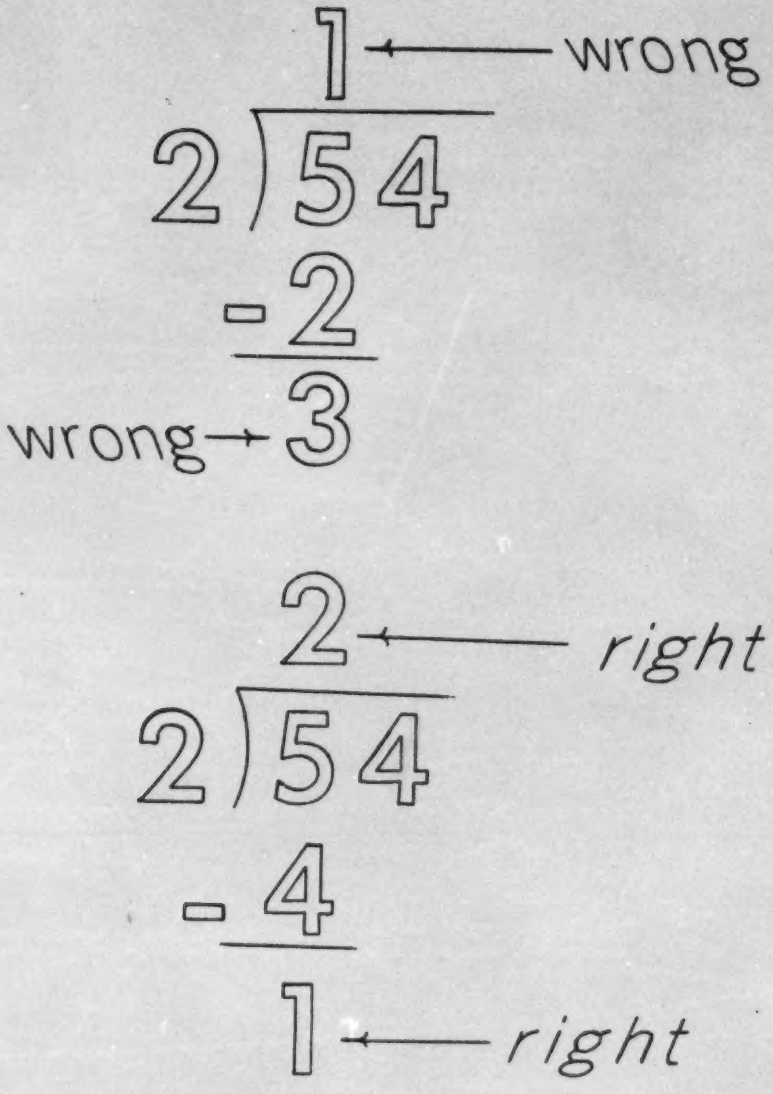


5 Steps

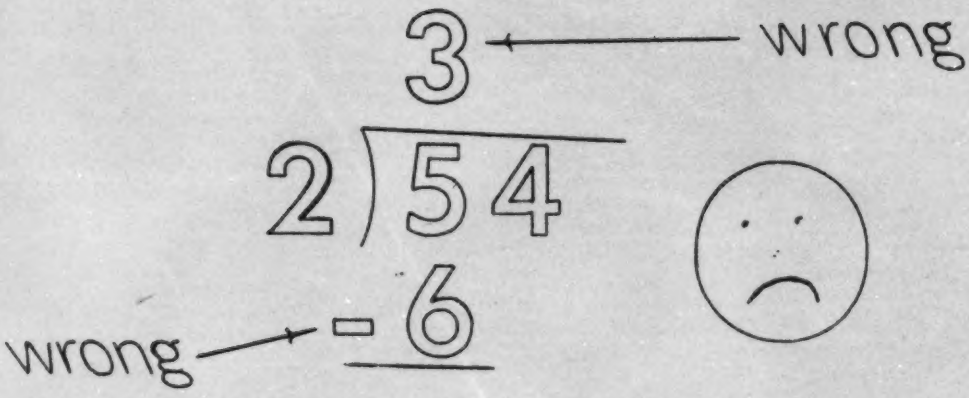
1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

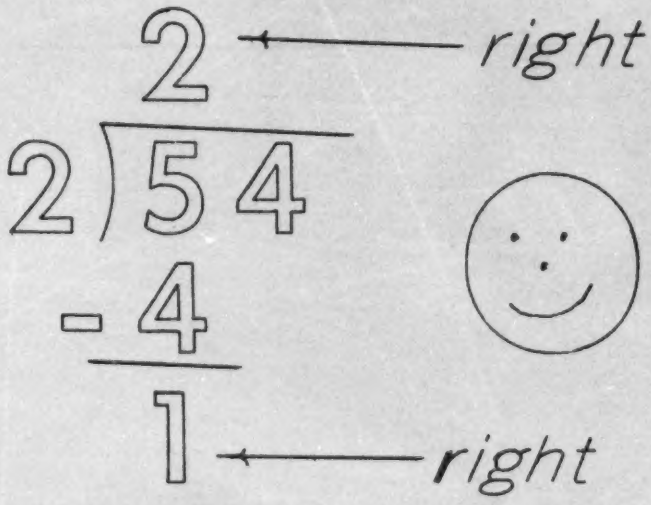


13



14

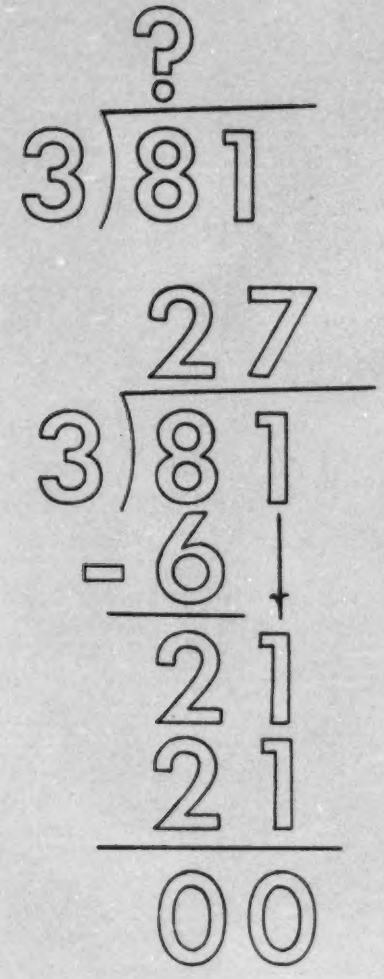




15

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over



16

-A-

$3\overline{)51}$

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

17

- B -

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

$4\overline{)56}$

18

RULES

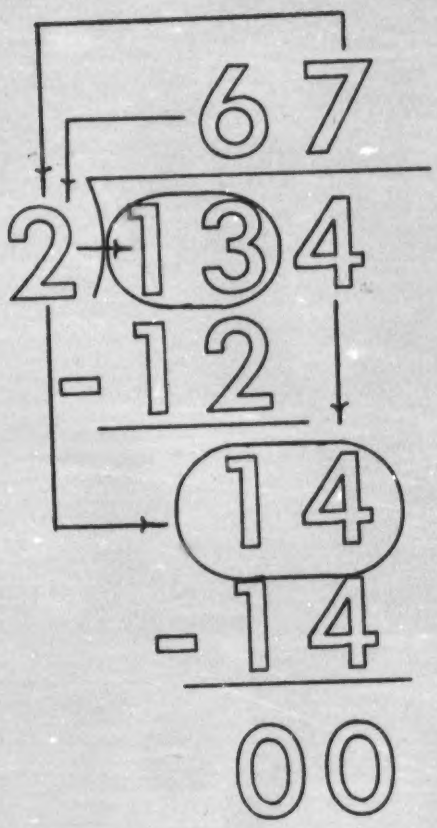
1.
2.
3.
4.
5.

$$3\overline{)135}$$

19

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over



Rule: "If the first number inside the bracket (dividend) is smaller than the number outside the bracket (divisor) then divide the number outside into as many numbers inside the bracket as is needed to get a larger number."

20

- A -

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

$4\overline{)136}$

21

- B -

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

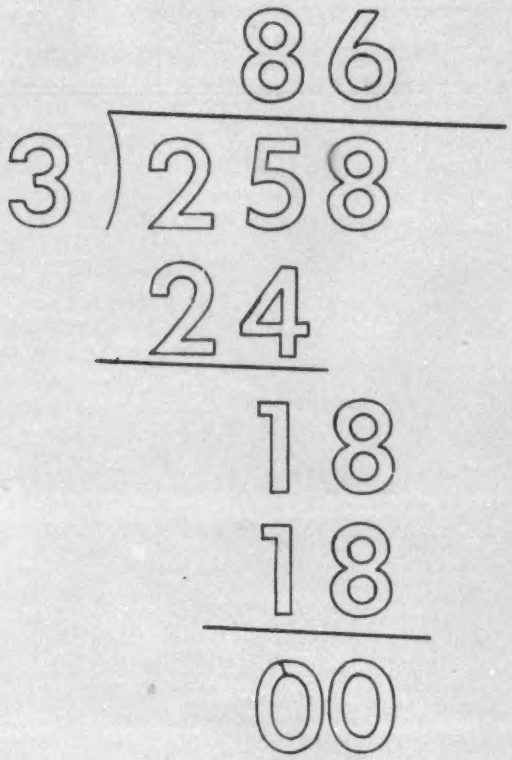
$6\overline{)336}$

Transparency

22

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over



Rule 1: "Divide the number outside the bracket (divisor) into the first number of the number inside the bracket (dividend) if that first number is as large or larger than the number outside the bracket."

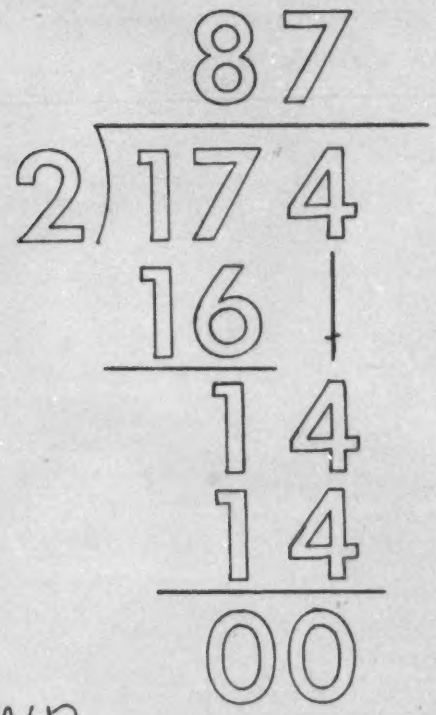
Rule 2: "If the first number inside the bracket (dividend) is smaller than the number outside the bracket (divisor) then divide the number outside into as many numbers inside the bracket as is needed to get a larger number."

(If the first number inside the bracket isn't big enough, use two or more numbers until it is bigger than the number outside the bracket.)

23

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over



24

- A -

$6\overline{)492}$

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

25

- B -

$3\overline{)171}$

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

26

5 Steps

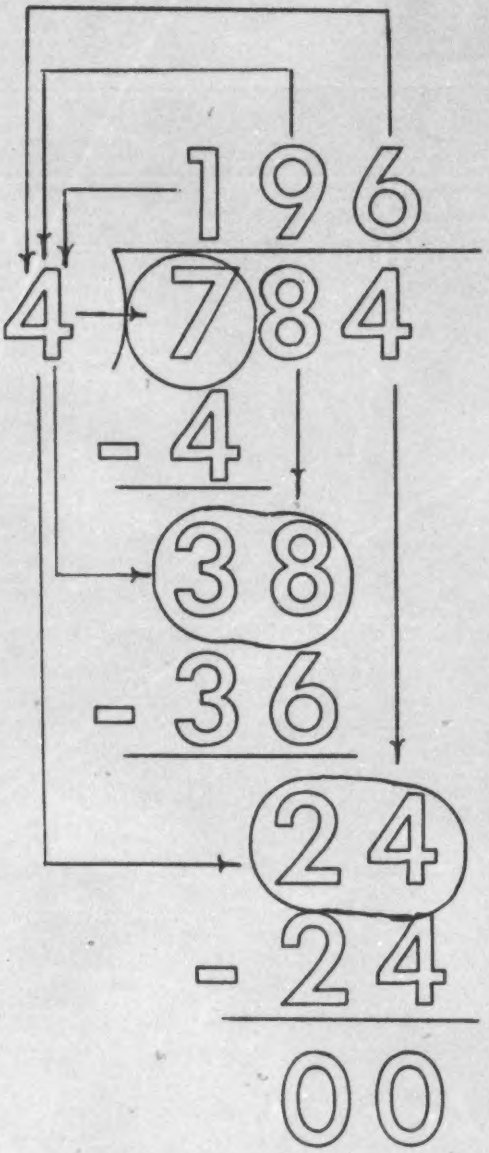
$4\overline{)796}$

1.
2.
3.
4.
5.

27

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over



28

- A -

$3\overline{)462}$

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

29

- B -

$4\overline{)1352}$

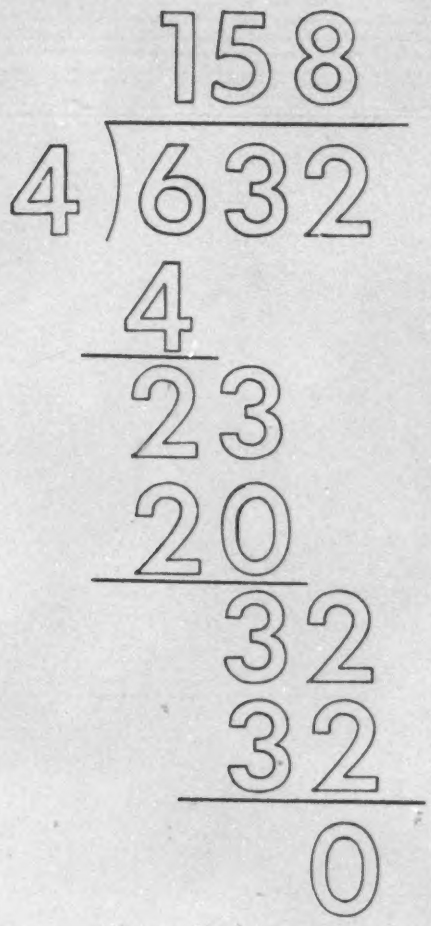
5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

30

5 Steps

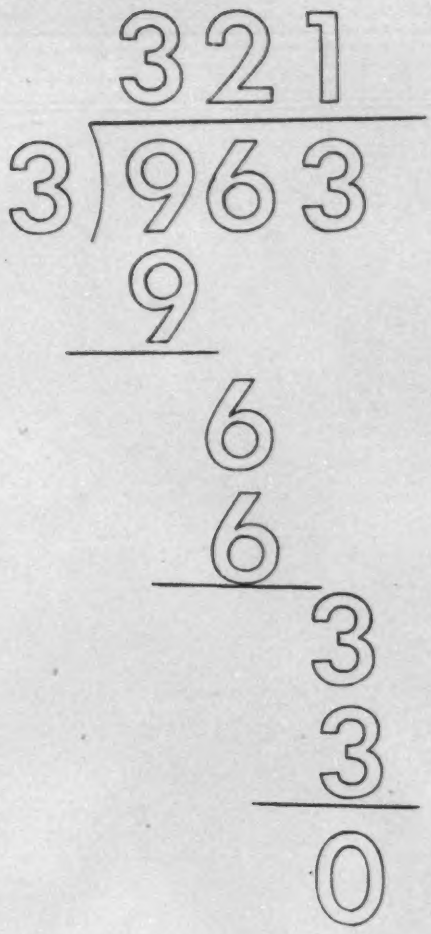
1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over



31

5 Steps

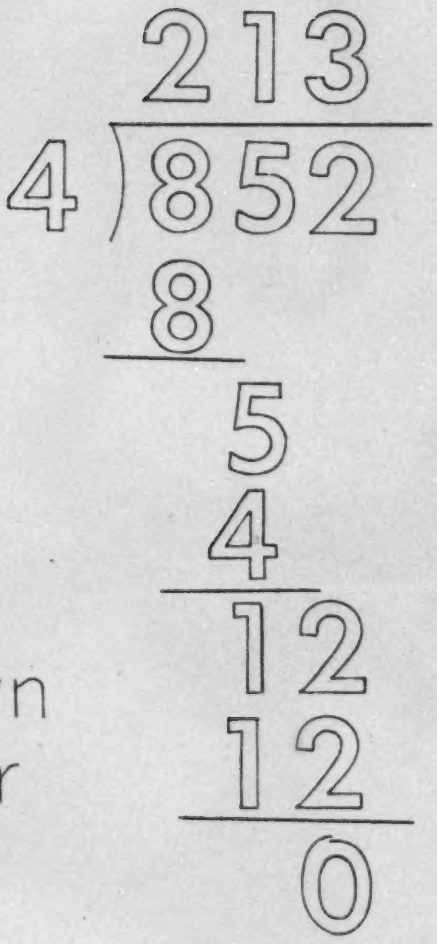
1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over



32

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over



33

-A-

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

$6\overline{)870}$

34

-B-

$2\overline{)842}$

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

35

-C-

$3\overline{)684}$

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

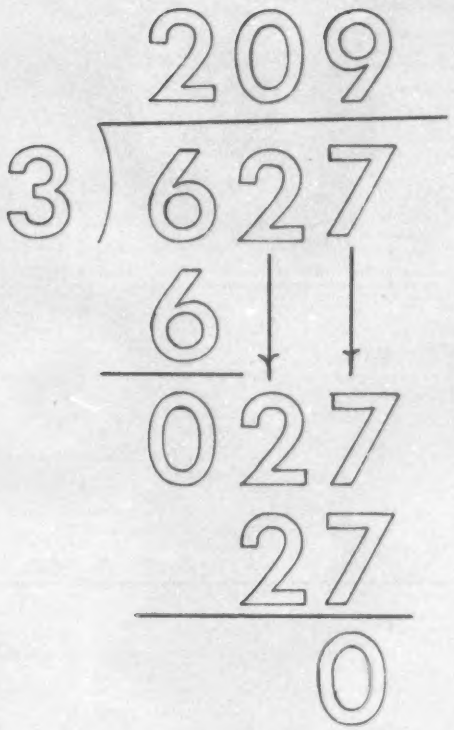
36

Every time you bring a number down from inside the bracket you put a number up in the answer row.

37

5 Steps

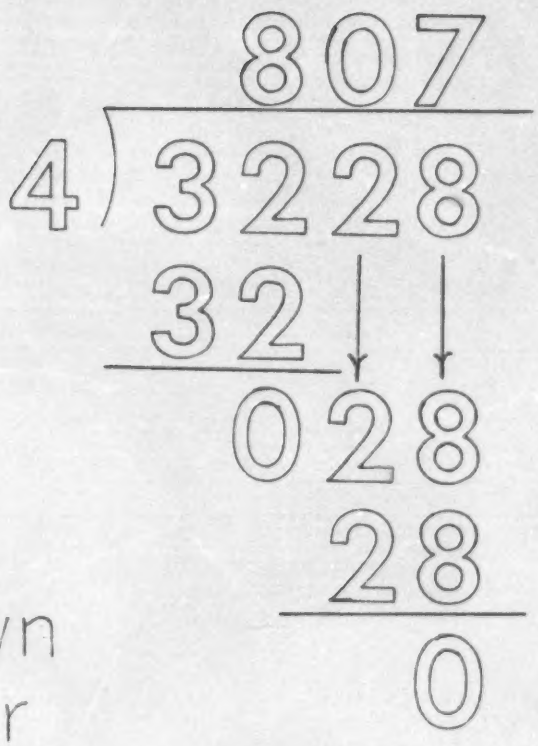
1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over



38

5 Steps

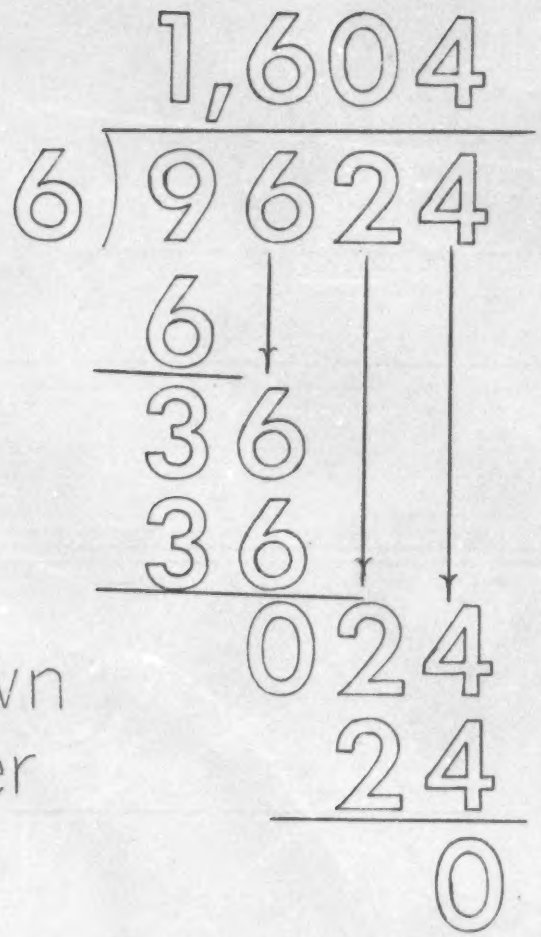
1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over



39

5 Steps

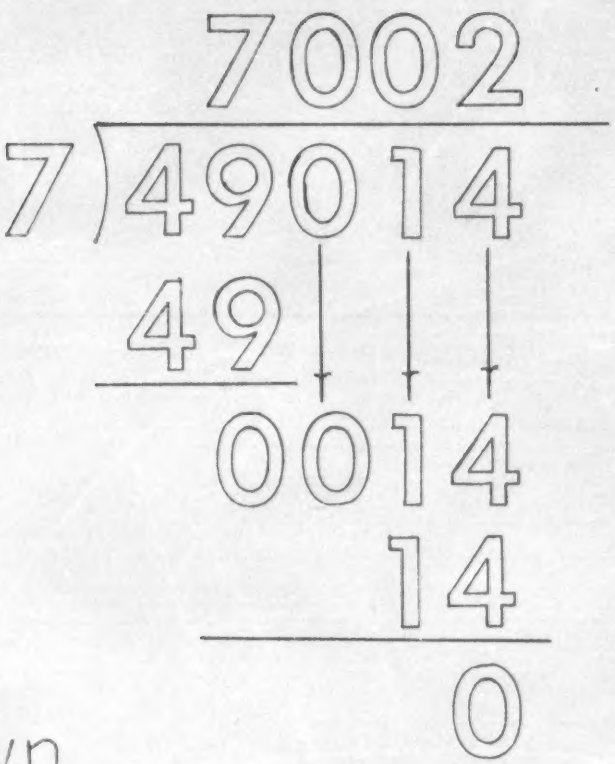
1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over



40

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over



Transparency

41

-A-

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

$4\overline{)812}$

Transparency

42

- B -

$6\overline{)13,830}$

5 Steps

1. Divide
2. Multiply
3. Subtract
4. Compare
5. Bring Down
   Start Over

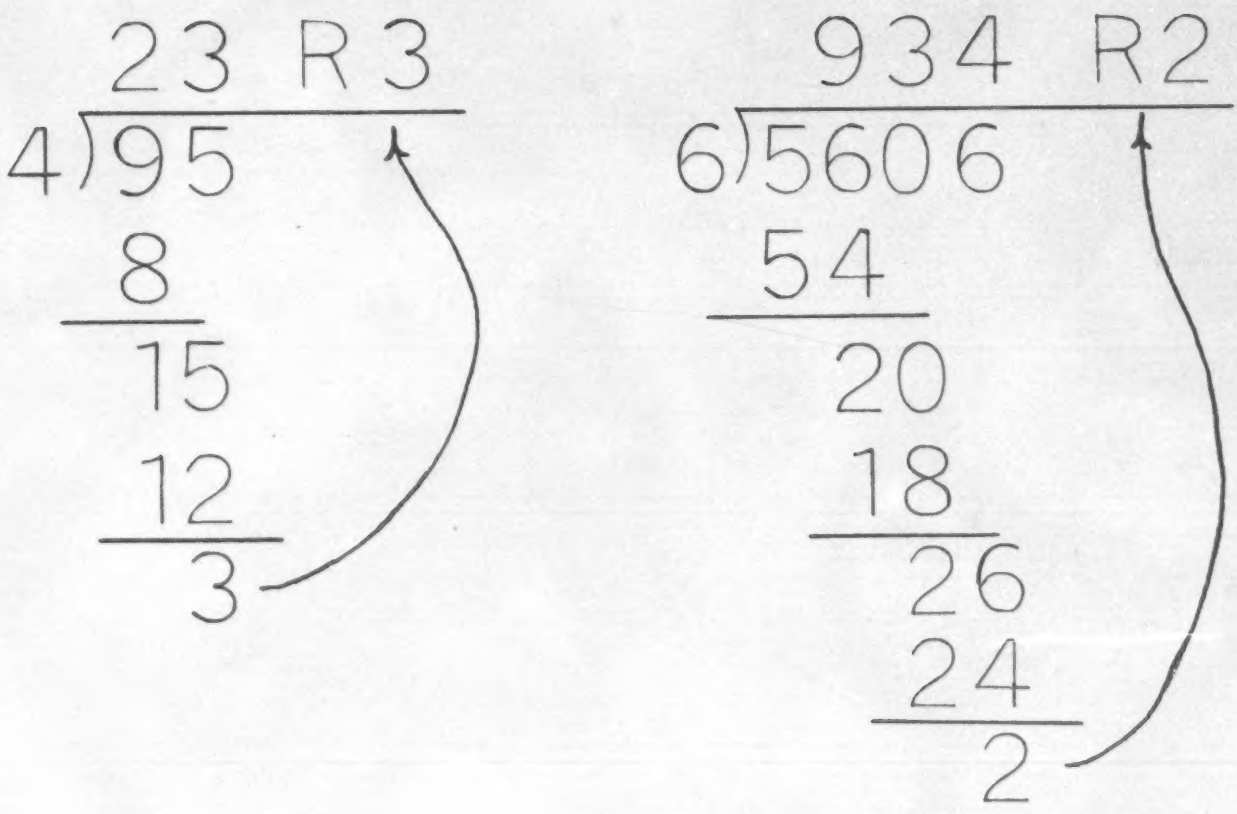
43

R = REMAINDER

Rule (a) "When you have a number under the subtraction line and there are no more numbers to bring down, put a capital R in the answer and put this number behind it."

Rule (b) "The remainder must always be smaller than the number outside of the bracket."

44



45

-A-

$$\begin{array}{r} 28 \\ 2\overline{)57} \\ \underline{4} \\ 17 \\ \underline{16} \\ 1 \end{array}$$

-B-

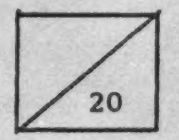
$$\begin{array}{r} 322 \\ 8\overline{)2581} \\ \underline{24} \\ 18 \\ \underline{16} \\ 21 \\ \underline{16} \\ 5 \end{array}$$

ENTRANCE TEST

Long Division to REmainder

Name_____ Date_____

Facts:	÷	____
	x	____
Borrow	-	____
Process	÷	____
	x	____
Borrow	-	____

Score 

(1) $\begin{array}{r} 32 \\ -\ 24 \\ \hline \end{array}$ $\begin{array}{r} 14 \\ -\ 14 \\ \hline \end{array}$ $\begin{array}{r} 12 \\ -\ 9 \\ \hline \end{array}$ $\begin{array}{r} 13 \\ -\ 11 \\ \hline \end{array}$

(2) $\begin{array}{r} 7 \\ \times\ 2 \\ \hline \end{array}$ $\begin{array}{r} 8 \\ \times\ 3 \\ \hline \end{array}$ 4 x 9 = $\begin{array}{r} 69 \\ \times\ 4 \\ \hline \end{array}$

(3) $7\overline{)21}$ $8\overline{)56}$ $9\overline{)72}$ $10\overline{)100}$

(4) $6\overline{)42}$ $1\overline{)8}$ $4\overline{)28}$ $12\overline{)144}$

(5) $8\overline{)32}$ $2\overline{)14}$ $3\overline{)0}$ $5\overline{)35}$

Total	
Process	

TEST

Name_____ Date_____

(1) $3\overline{)87}$ (2) $4\overline{)93}$ (3) $4\overline{)468}$

(4) $7\overline{)161}$ (5) $6\overline{)624}$ (6) $5\overline{)132}$

(7) $9\overline{)513}$ (8) $7\overline{)471}$ (9) $6\overline{)107}$

(10) $4\overline{)2032}$

KEYS

Long Division Process to Remainder

Entrance Test

Row 1 - 8, 0, 3, 2
Row 2 - 14, 24, 36, 276
Row 3 - 3, 7, 8, 10
Row 4 - 7, 8, 7, 12
Row 5 - 4, 7, 0, 7

Page 1

(1) 16 (2) 17 (3) 23
(4) 16 (5) 13 (6) 18

Page 2

(1) 24 (2) 24 (3) 15
(4) 13 (5) 28 (6) 15

Page 3

14	24	14	23	13
17	15	21	32	18
14	13	16	13	18
18	21	16	15	18

Page 4

16	21	16	14	15
23	19	19	13	33
13	23	24	27	14
26	16	16	18	46

Page 5

17	15	41	17	16
32	17	25	13	15
37	13	19	13	15
18	15	31	23	27

Page 6

(1) 49 (2) 55 (3) 94
(4) 85 (5) 59 (6) 57

Page 7

(1) 34 (2) 53 (3) 35
(4) 94 (5) 95

Page 8

51	63	65	32	54
25	52	61	91	67
56	82	67	84	63
87	93	87	75	62

Page 9

52	54	48	68	63
56	36	32	24	92
39	98	69	91	86
54	29	94	58	91

Page 10

43	31	66	78	43
47	58	93	89	67
48	75	73	45	99
89	56	96	69	72

Page 11

66	48	88	57	45
23	59	85	54	87
92	84	83	95	86
73	23	77	48	95

Page 12

85	36	27	29	74
67	95	32	89	61
49	46	61	99	28
24	53	39	59	85

Page 13

(1) 183 (2) 198 (3) 568
(4) 134 (5) 593 (6) 175

Page 14

(1) 243 (2) 238 (3) 114
(4) 282 (5) 132 (6) 134

Page 15

42	37	88	89	23
293	56	95	284	62
56	65	321	66	274
51	258	63	49	93

Page 16

621	57	251	391	25
64	58	67	63	35
57	64	52	42	49
95	97	31	81	46

Page 17

135	745	51	13	919
474	863	332	43	753
622	213	67	199	483
278	783	335	561	713

Page 18

267	596	393	482	148
98	597	792	328	487
279	763	432	972	152
653	324	435	741	263

Page 19

89	271	65	47	83
132	59	145	158	507
47	133	122	85	64
446	58	97	437	81

Page 20

(1) 106 (2) 2703 (3) 2090
(4) 20405 (5) 7004 (6) 206

Page 21

809	65	83	908	56
309	66	70	305	57
130	419	73	560	509
88	96	501	630	35

Page 22

203	503	1508	604	608
204	307	607	407	403
408	205	306	109	407
805	408	507	208	309

Page 23

406	705	308	508	408
608	45602	109	106	707
503	703	406	1205	1206
911	2041	1109	1406	309

Page 24

408	51	407	803	2104
309	3114	83	717	4081
532	191	509	614	508
1804	507	1706	357	708

Page 25

(1) 26R1 (2) 41R2 (3) 517R5
(4) 1486R2 (5) 460R3
(6) 2089R1

Page 26

14R3	82R2	607R4	609R1	330R1
2637R2	1321R1	74R2	24R2	957R6
129R1	396R6	160R5	163R2	4678R2
1942R4	706R1	19R2	4125R1	901R3

Page 27

28R3	93R5	78R5	17R6	56R1
304R1	263R1	89R4	88R6	90R3
105R5	33R2	149	145R1	197R1
122R2	165R1	92R5	84R7	128R3

Page 28

15	139R2	277	502	12R1
174R1	38	825	208	16R2
98	654	79R5	29	690
53	505	487	294	1362
850	47	486	799	307

Page 29

149R1	23	713	97
94	1706	28	84
93	419		

Page 30

449R1	72	13	501
67	122	306	56
713	263R1		

Page 31

419	58	25	863
84	284	128R3	47
88R6	403		

Page 32

27	65	87	93
63	199	263	560
607	89R4		

Page 33

17R6	132	28R3	622
13	83	36	1508
321	608		

Final Test

29	23R1	117	
23	104	26R2	
57	67R2	17R5	508